

Remarks

This amendment is submitted in response to the Official Action mailed October 5, 2005.

Review and reconsideration of this application are respectfully requested.

Restriction to one of the following inventions is required under 35 U.S.C. 121:

Claims 1-10 and 20-22, drawn to a tubular structure, classified in class 428, subclass 36.9.

Claims 11-19, drawn to a method for forming a tubular structure, classified in class 264, subclass 405.

In accordance with the examiner's requirement, applicant affirms the previous provisional election of group I made during a telephone conversation between Joseph V. Tassone and the examiner on March 7, 2005. Accordingly, claims 11-19 (group II) are canceled by this amendment.

Claim 22 is objected to because claim 22 depends from claim 29, which is not a pending claim.

Claim 22 has been amended to depend from claim 1.

Rejections

Claims 1-10 and 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Igarashi et al. (5,223,571).

In regard to claim 1, the examiner alleges that Igarashi et al. teach a vulcanized tubular structure (hose, col. 5, lines 49-50) comprising a composition containing a vinyl ester copolymer

(ethylene-vinyl acetate copolymer, col. 3, lines 32-35 and col. 4, lines 22-26) where the vinyl ester copolymer contains greater than 40% vinyl ester based on the weight of the copolymer (col. 3, lines 48-51). Igarashi et al. teach that the tubular structure is automotive fluid-conveying (col. 2, lines 54-57). The tubular structure of Igarashi et al. is heat tolerant because Igarashi et al teach that the tubular structure is heat resistant (col. 2, lines 50-54). Any hose is resistant to some degree of pressure, so the hose of Igarashi et al. is necessarily resistant to some degree of pressure. The tubular structure of Igarashi et al is hydrocarbon fluid impermeable since Igarashi et al. teach that the tubular structure is gas impermeable (col. 2, lines 50-53).

In regard to claim 2, Igarashi et al. teach the ethylene-vinyl acetate copolymer contains more than 60% vinyl acetate by weight of the copolymer since Igarashi Et al. teach that the ethylene-vinyl acetate copolymer contains not more than 40 mol % ethylene (consequently, at least 60 mol % vinyl acetate, col. 3, lines 39-41).

In regard to claim 3, the ethylene-vinyl acetate copolymer of Igarashi et al. is an olefin-vinyl ester since ethylene is an olefin.

In regard to claims 4 and 5, Igarashi et al. teach that the tubular structure contains an ethylene-vinyl acetate copolymer (col. 3, lines 32-35 and col. 4, lines 22-26).

In regard to claim 6, Igarashi et al. teach that the composition contains not more than 250 parts by weight of the ethylene-vinyl acetate copolymer per 100 parts by weight of the second resin of the composition (the "CPA" resin of Igarashi et al., col. 3, lines 48-51) a range that overlaps with the claimed range of about 30 to 75% ethylene-vinyl acetate. Igarashi et al. teach that the composition contains up to 70 parts rubber additive per 100 parts CPA (col. 3, line 64- col. 4, line 7 a range that falls within the claimed range of about 25 to 70% (e.g., $70/(70 + 90 + 100) = \text{about } 27\%$).

In regard to claims 7 and 8, Igarashi et al. teach that the rubber additive is a process aid (see col. 3, line 64 - col. 4, line 4).

In regard to claim 9, Igarashi et al. teach that the composition further comprises EPDM or NBR (col. 3, line 64 - col. 4, line 4).

In regard to claim 10, Igarashi et al., at least 60 mol % teach a vulcanized automotive fluid-conveying tubular structure (hose, col. 5, lines 49-50 and col. 2, lines 54-57) comprises an ethylene-vinyl acetate copolymer (col. 3, lines 32-35 and col. 4, lines 22-26) having a vinyl acetate content of more than 60% vinyl acetate by weight of the copolymer since Igarashi et al. teach that the ethylene-vinyl acetate copolymer contains not more than 40 mol % ethylene (consequently, at least 60 mol % vinyl acetate, col. 3, lines 39-41). Igarashi et al. teach that the composition comprises a rubber additive and a second resin (the "CPA" resin of Igarashi et al.) that corresponds to an additive as claimed by applicant. Igarashi et al. teach that the rubber additive is a process aid (see col. 3, line 64-66) and that the rubber additive is a polyethylene (col. 3, lines 64-68). Igarashi et al. teach that the composition contains not more than 250 parts by weight of the ethylene-vinyl acetate copolymer per 100 parts by weight of the second resin of the composition (the CPA" resin of Igarashi et al, col. 3, lines 48-51) and that the composition contains up to 70 parts of the rubber additive per 100 parts CPA (col. 3, line 64 - col. 4, line 7) so the claimed relative amount ranges overlap with the relative amount ranges taught by Igarashi et al. (e.g., $150 \text{ parts copolymer} / (150 + 100 + 50) = 50\%$ and $(100 + 50) / (150 + 100 + 50) = 50\%$).

In regard to claim 20, Igarashi et al. teach a vulcanized tubular structure (hose, col. 5, lines 49-50) comprising a composition containing ethylene-vinyl acetate copolymer (col. 3, lines 32-35 and col. 4, lines 22-26) where the ethylene-vinyl acetate copolymer contains greater than 40% vinyl acetate based on the weight of the copolymer (col. 3, lines 48-51). Igarashi et al. teach that the tubular structure is automotive fluid-conveying (col. 2, lines 54-57). The tubular structure of Igarashi et al. is heat tolerant because Igarashi et al. teach that the tubular structure is heat resistant (col. 2, lines 50-54). Any hose is resistant to some degree of pressure, so the hose of Igarashi et al. is necessarily resistant to some degree of pressure. The tubular structure of Igarashi et al. is hydrocarbon fluid impermeable since Igarashi et al. teach that the tubular

structure is gas impermeable (col. 2, lines 50-53). Igarashi et al. teach that the composition contains a rubber additive that is a process aid (see col. 3, line 64 - col. 4, line 7).

In regard to claims 21 and 22, Igarashi et al. teach the hose as discussed above. The recitations "is a radiator hose" and "is a heater hose" are intended use recitations that have not been given patentable weight, since it has been held that a recitation with respect to the manner in which a claimed article is intended to be employed does not differentiate the claimed article from a prior art article satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQd 1647 (1987).

Response to rejections

In regard to claim 1, applicant contends that the present tubular structure is a vinyl ester copolymer containing greater than 40% vinyl ester. In contradistinction to the tubular structure of the present invention, Igarashi et al. teach a refrigeration transport hose comprising an inner tube comprising a refrigerant gas-impermeable resinous layer formed of a very specific polyamide resin produced by the reaction of hexamethylene diamine and an aliphatic dicarboxylic acid having eight to sixteen carbon atoms (CPA resin); an outer rubber layer; and a reinforcing fiber layer between the inner layer and the outer layer. Igarashi et al have found that common polyamides resins such as nylon 6 and nylon 6-66 copolymer are not suitable and that only the specific polyamide resin produced by condensation of hexamethylene diamine and an aliphatic dicarboxylic acid whose molecule has 8 to 16 carbon atoms is satisfactory in regard to the three requirements (of their invention), i.e., high gas impermeability, flexibility and heat resistance (col. 2, lines 33-43). In one embodiment, the inner layer contains 100% of the CPA resin (col. 3, lines 30-31). In a second embodiment, the inner layer further contains a saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). Applicant submits that saponified ethylene-vinyl acetate is not ethylene-vinyl acetate. Saponified ethylene-vinyl acetate copolymer is structurally distinct from ethylene-vinyl acetate copolymer. Furthermore, Igarashi et al requires that at least 90 mol % of the vinyl acetate of the ethylene-

vinyl acetate copolymer be saponified (col. 3, lines 39-42) in order to provide a product having a sufficient level of heat resistance (col. 3, lines 43-47). Applicant submits that the saponified ethylene-vinyl acetate copolymer of Igarashi et al. is a copolymer of ethylene and saponified vinyl acetate when the degree of saponification is 100%, and is a terpolymer of ethylene, saponified vinyl acetate and vinyl acetate when the degree of saponification is less than 100%. In either case, the saponified ethylene-vinyl acetate copolymer of Igarashi et al is structurally different from the vinyl ester copolymer of the present invention. Therefore, applicant contends that the present invention is not anticipated by Igarashi et al, nor is there any teaching in Igarashi et al which would lead one of ordinary skill in the art to the present invention. In fact, since Igarashi et al. specifically state that if the degree of saponification is less than 90 mol %, the heat resistance of the product formed of the resinous composition tends to be lowered to an unsatisfactory level, applicant contends that Igarashi et al actually teach away from the present invention. Accordingly, applicant submits that the present invention is not obvious over the teachings of Igarashi et al.

The gas impermeable resinous composition of Igarashi et al. contains not more than 250 parts by weight of the saponified ethylene-vinyl acetate copolymer per 100 parts by weight of the CPA resin (Col. 3, lines 48-51). In contradistinction to the resinous composition of Igarashi et al., the tubular structure of the present invention does not contain the "CPA" resin defined by Igarashi et al as a specific polyamide resin produced by condensation polymerization of hexamethylene diamine and an aliphatic carboxylic acid whose molecule has 8 to 16 carbon atoms (col. 2., lines 35-38).

In regard to claim 2, applicant submits that the resinous composition of Igarashi et al. is, in one embodiment, a 100% CPA resin (col. 3, lines 29-32). In a second embodiment, the resinous composition may further contain saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). In the second embodiment, the resinous composition contains not more than 250 parts of saponified ethylene-vinyl acetate copolymer per 100 parts by weight of the CPA resin (Col. 3, lines 48-51). If the proportion of the copolymer

exceeds 250 parts by weight, the flexibility of the product is insufficiently low (col. 3, lines 51-54). The ethylene-vinyl acetate copolymer of Igarashi et al. is not necessarily 100% saponified and therefore may contain some residual vinyl acetate units. The saponified ethylene-vinyl acetate copolymer of Igarashi et al is more appropriately characterized as being a CPA-ethylene-vinyl acetate-saponified vinyl acetate terpolymer when the degree of saponification is less than 100%. As argued above, the resinous composition of Igarashi et al. is either a 100% CPA resin, a CPA resin containing an ethylene-saponified vinyl acetate copolymer, or a CPA resin containing an ethylene-saponified vinyl acetate-vinyl acetate terpolymer, each of which is distinctly different from the vinyl ester copolymer defined in claim 2 of the present invention. Therefore, applicant contends that claim 2 is neither anticipated nor rendered obvious by Igarashi et al.

In regard to claim 3, applicant submits that the resinous composition of Igarashi et al. is, in one embodiment, a 100% CPA resin (col. 3, lines 29-32). In a second embodiment, the resinous composition may further contain saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). In the second embodiment, the resinous composition contains not more than 250 parts of saponified ethylene-vinyl acetate copolymer per 100 parts by weight of the CPA resin (Col. 3, lines 48-51). If the proportion of the copolymer exceeds 250 parts by weight, the flexibility of the product is insufficiently low (col. 3, lines 51-54). The ethylene-vinyl acetate copolymer of Igarashi et al. is not necessarily 100% saponified and therefore may contain some residual vinyl acetate units. The saponified ethylene-vinyl acetate copolymer of Igarashi et al is more appropriately characterized as being a CPA-ethylene-vinyl acetate-saponified vinyl acetate terpolymer when the degree of saponification is less than 100%. As argued above, the resinous composition of Igarashi et al. is either a 100% CPA resin, a CPA resin containing an ethylene-saponified vinyl acetate copolymer, or a CPA resin containing an ethylene-saponified vinyl acetate-vinyl acetate terpolymer, each of which is distinctly different from the olefin-vinyl ester copolymer defined in claim 3 of the present invention. Therefore, applicant contends that claim 3 is neither anticipated nor rendered obvious by Igarashi et al.

In regard to claim 4, applicant submits that the resinous composition of Igarashi et al. is, in one embodiment, a 100% CPA resin (col. 3, lines 29-32). In a second embodiment, the resinous composition may further contain saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). In the second embodiment, the resinous composition contains not more than 250 parts of saponified ethylene-vinyl acetate copolymer per 100 parts by weight of the CPA resin (Col. 3, lines 48-51). If the proportion of the copolymer exceeds 250 parts by weight, the flexibility of the product is insufficiently low (col. 3. lines 51-54). The ethylene-vinyl acetate copolymer of Igarashi et al. is not necessarily 100% saponified and therefore may contain some residual vinyl acetate units. The saponified ethylene-vinyl acetate copolymer of Igarashi et al is more appropriately characterized as being a CPA-ethylene-vinyl acetate-saponified vinyl acetate terpolymer when the degree of saponification is less than 100%. As argued above, the resinous composition of Igarashi et al. is either a 100% CPA resin, a CPA resin containing an ethylene-saponified vinyl acetate copolymer, or a CPA resin containing an ethylene-saponified vinyl acetate-vinyl acetate terpolymer, each of which is distinctly different from the ethylene-vinyl ester copolymer defined in claim 4 of the present invention. Therefore, applicant contends that claim 4 is neither anticipated nor rendered obvious by Igarashi et al.

Claim 5 has been canceled as being a duplicate of claim 4.

In regard to claim 6, applicant submits that the resinous composition of Igarashi et al. is, in one embodiment, a 100% CPA resin (col. 3, lines 29-32). In a second embodiment, the resinous composition may further contain saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). In the second embodiment, the resinous composition contains not more than 250 parts of saponified ethylene-vinyl acetate copolymer per 100 parts by weight of the CPA resin (Col. 3, lines 48-51). If the proportion of the copolymer exceeds 250 parts by weight, the flexibility of the product is insufficiently low (col. 3. lines 51-54). The ethylene-vinyl acetate copolymer of Igarashi et al. is not necessarily 100% saponified

and therefore may contain some residual vinyl acetate units. The saponified ethylene-vinyl acetate copolymer of Igarashi et al is more appropriately characterized as being a CPA-ethylene-vinyl acetate-saponified vinyl acetate terpolymer when the degree of saponification is less than 100%. As argued above, the resinous composition of Igarashi et al. is either a 100% CPA resin, a CPA resin containing an ethylene-saponified vinyl acetate copolymer, or a CPA resin containing an ethylene-saponified vinyl acetate-vinyl acetate terpolymer, each of which is distinctly different from the ethylene-vinyl acetate copolymer defined in claim 6 of the present invention. Therefore, applicant contends that claim 6 is neither anticipated nor rendered obvious by Igarashi et al.

In regard to claim 7, applicant submits that the ethylene-vinyl acetate copolymer tubular structure of the present invention is neither anticipated or rendered obvious by the patent to Igarashi et al. as argued above and, since claim 7 merely recites further limitations of a base claim from which claim 7 depends, applicant submits that claim 7 also is neither anticipated nor rendered obvious by the patent to Igarashi et al.

In regard to claim 8, applicant submits that the ethylene-vinyl acetate copolymer tubular structure of the present invention is neither anticipated or rendered obvious by the patent to Igarashi et al. as argued above and, since claim 8 merely recites further limitations of a base claim from which claim 8 depends, applicant submits that claim 8 also is neither anticipated nor rendered obvious by the patent to Igarashi et al.

In regard to claim 9, applicant submits that the ethylene-vinyl acetate copolymer tubular structure of the present invention is neither anticipated or rendered obvious by the patent to Igarashi et al. as argued above and, since claim 9 merely recites further limitations of a base claim from which claim 9 depends, applicant submits that claim 9 also is neither anticipated nor rendered obvious by the patent to Igarashi et al.

In regard to claim 10, applicant contends that the present tubular structure is an ethylene-

vinyl acetate copolymer having a vinyl acetate content of about 60 to 90% based on the weight of the copolymer. The tubular structure further comprises about 45 to 60% ethylene-vinyl acetate copolymer and about 40 to 55% of one or more additives which are defined therein. In contradistinction to the tubular structure of the present invention, Igarashi et al. teach a refrigeration transport hose comprising an inner tube comprising a refrigerant gas-impermeable resinous layer formed of a very specific polyamide resin produced by the reaction of hexamethylene diamine and an aliphatic dicarboxylic acid having eight to sixteen carbon atoms (CPA resin); an outer rubber layer; and a reinforcing fiber layer between the inner layer and the outer layer. Igarashi et al have found that common polyamides resins such as nylon 6 and nylon 6-66 copolymer are not suitable and that only the specific polyamide resin produced by condensation of hexamethylene diamine and an aliphatic dicarboxylic acid whose molecule has 8 to 16 carbon atoms is satisfactory in regard to the three requirements (of their invention), i.e., high gas impermeability, flexibility and heat resistance (col. 2, lines 33-43). In one embodiment, the inner layer contains 100% of the CPA resin (col. 3, lines 30-31). In a second embodiment, the inner layer further contains a saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). Applicant submits that saponified ethylene-vinyl acetate is not ethylene-vinyl acetate. Saponified ethylene-vinyl acetate copolymer is structurally distinct from ethylene-vinyl acetate copolymer. Furthermore, Igarashi et al requires that at least 90 mol % of the vinyl acetate of the ethylene-vinyl acetate copolymer be saponified (col. 3, lines 39-42) in order to provide a product having a sufficient level of heat resistance (col. 3, lines 43-47). Applicant submits that the saponified ethylene-vinyl acetate copolymer of Igarashi et al. is a copolymer of ethylene and saponified vinyl acetate when the degree of saponification is 100%, and is a terpolymer of ethylene, saponified vinyl acetate and vinyl acetate when the degree of saponification is less than 100%. In either case, the saponified ethylene-vinyl acetate copolymer of Igarashi et al is structurally different from the vinyl ester copolymer of the present invention. Therefore, applicant contends that claim 10 of the present invention is not anticipated by Igarashi et al, nor is there any teaching in Igarashi et al which would lead one of ordinary skill in the art to the present invention as defined by claim 10. In fact, since Igarashi et al. specifically state that if the degree of saponification is less than 90 mol %, the heat resistance of the product formed of

the resinous composition tends to be lowered to an unsatisfactory level, applicant contends that Igarashi et al actually teach away from the present invention as defined by claim 10. Accordingly, applicant submits that claim 10 is not obvious over the teachings of Igarashi et al.

Claims 11-19 have been canceled as being directed to a non-elected invention.

In regard to claim 20, applicant contends that claim 20 is presented in Jepson form to define the improvement in an automotive fluid-conveying tubular structure wherein the improvement comprises employing as the tubular structure a vulcanized heat tolerant, pressure resistant, hydrocarbon fluid impermeable composition comprising an ethylene-vinyl acetate copolymer matrix having greater than about 40% vinyl acetate based on the weight of the copolymer. The ethylene-vinyl acetate copolymer matrix further contains one or more additives defined therein. In contradistinction to the tubular structure defined by claim 20, Igarashi et al. teach a refrigeration transport hose comprising an inner tube comprising a refrigerant gas-impermeable resinous layer formed of a very specific polyamide resin produced by the reaction of hexamethylene diamine and an aliphatic dicarboxylic acid having eight to sixteen carbon atoms (CPA resin); an outer rubber layer; and a reinforcing fiber layer between the inner layer and the outer layer. Igarashi et al have found that common polyamides resins such as nylon 6 and nylon 6-66 copolymer are not suitable and that only the specific polyamide resin produced by condensation of hexamethylene diamine and an aliphatic dicarboxylic acid whose molecule has 8 to 16 carbon atoms is satisfactory in regard to the three requirements (of their invention), i.e., high gas impermeability, flexibility and heat resistance (col. 2, lines 33-43). In one embodiment, the inner layer contains 100% of the CPA resin (col. 3, lines 30-31). In a second embodiment, the inner layer further contains a saponified ethylene-vinyl acetate copolymer in addition to the CPA resin (col. 3, lines 32-34). Applicant submits that saponified ethylene-vinyl acetate is not ethylene-vinyl acetate. Saponified ethylene-vinyl acetate copolymer is structurally distinct from ethylene-vinyl acetate copolymer. Furthermore, Igarashi et al requires that at least 90 mol % of the vinyl acetate of the ethylene-vinyl acetate copolymer be saponified (col. 3, lines 39-42) in order to provide a product having a sufficient level of heat resistance (col. 3, lines 43-47).

Applicant submits that the saponified ethylene-vinyl acetate copolymer of Igarashi et al. is a copolymer of ethylene and saponified vinyl acetate when the degree of saponification is 100%, and is a terpolymer of ethylene, saponified vinyl acetate and vinyl acetate when the degree of saponification is less than 100%. In either case, the saponified ethylene-vinyl acetate copolymer of Igarashi et al is structurally different from the vinyl ester copolymer of the present invention. Therefore, applicant contends that claim 10 of the present invention is not anticipated by Igarashi et al, nor is there any teaching in Igarashi et al which would lead one of ordinary skill in the art to the present invention as defined by claim 10. In fact, since Igarashi et al. specifically state that if the degree of saponification is less than 90 mol %, the heat resistance of the product formed of the resinous composition tends to be lowered to an unsatisfactory level, applicant contends that Igarashi et al actually teach away from the present invention as defined by claim 10.

Accordingly, applicant submits that claim 10 is not obvious over the teachings of Igarashi et al.

In regard to claim 21, applicant submits that the ethylene-vinyl acetate copolymer tubular structure of claim 21 is neither anticipated or rendered obvious by the patent to Igarashi et al. as argued above and, since claim 21 merely recites further limitations of a base claim from which claim 21 depends, applicant submits that claim 21 also is neither anticipated nor rendered obvious by the patent to Igarashi et al.

In regard to claim 22, applicant submits that the ethylene-vinyl acetate copolymer tubular structure of claim 22 is neither anticipated or rendered obvious by the patent to Igarashi et al. as argued above and, since claim 22 merely recites further limitations of a base claim from which claim 22 depends, applicant submits that claim 22 also is neither anticipated nor rendered obvious by the patent to Igarashi et al.

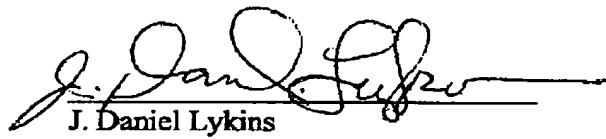
Summary

Applicant contends that Igarashi et al teach a gas impermeable resinous composition

formed from a very specific polyamide produced by condensation polymerization of hexamethylene diamine and an aliphatic carboxylic acid whose molecule has 8 to 16 carbon atoms (CPA) as the resinous matrix. The resinous matrix may be 100% CPA or the resinous matrix may contain a saponified ethylene-vinyl acetate copolymer in addition to the CPA. It is noteworthy that Igarashi et al. make an intentional and purposeful effort to saponify the ethylene-vinyl acetate copolymer to the extent that greater than 90% of the vinyl acetate units are saponified in order to provide a resinous material of which would be effective for his particular purpose. The structure of saponified ethylene-vinyl acetate copolymers are distinctly different from ethylene-vinyl acetate copolymers and, in the absence of evidence to the contrary, one would not predict the behavior of one of the copolymers based upon the known behavior of the other copolymer in a specific environment. Accordingly, one structure does not anticipate the other structure.

In view of the forgoing amendments and remarks, it is believed that the present application is now in condition for allowance and an early indication thereof is earnestly solicited.

Respectfully submitted,



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